

CLAIMS

I Claim:

1. A fastener setting apparatus for setting, to a workpiece, a nut-type fastener such as a blind nut which is formed as a hollow internally threaded tubular body with one end having a flange or a larger diameter portion, said fastener setting apparatus comprising: a mandrel adapted to be screwed into said fastener; a hydraulic cylinder for receiving therein a hydraulic piston for axially pulling said mandrel; an oil reservoir for containing oil to be supplied to said hydraulic cylinder; a ram reciprocatably disposed in said oil reservoir; an air cylinder for receiving therein an air piston which allows said ram connected thereto to be reciprocatingly advanced and retracted in said oil reservoir, wherein upon triggering, compressed air is supplied to said air cylinder to move said air piston to advance said ram into said oil reservoir to thereby supply oil from said oil reservoir to said hydraulic cylinder so that said hydraulic piston is moved to pull said mandrel, whereby said fastener threadedly connected with said mandrel is set to said workpiece,

said fastener setting apparatus further comprising:

an air-pressure setting valve for adjustably presetting the air pressure of the compressed air to be supplied in said air cylinder and applied to said air piston;

a completion valve operable to discharge the compressed air from said air cylinder outside to stop the movement of said hydraulic piston; and

completion valve activation assembly for enabling said completion valve to be operated,

wherein when the air pressure in said air cylinder reaches the preset air pressure level, said air-pressure setting valve is operated to feed the compressed air from said air cylinder to said completion valve activation assembly so as to stop said hydraulic piston from axially pulling said mandrel at said preset air pressure.

2. The apparatus as defined in claim 1, wherein said air-pressure setting valve includes:

a valve element;

a valve housing for receiving said valve element therein and having an inlet in fluid communication with said air cylinder;

a spring for pressing said valve element against said inlet with a certain spring force to prevent the compressed air in said air cylinder from being discharged; and

a spring holder attached to said valve housing for holding said spring and having an outlet for releasing the compressed air, said spring holder being attached to said valve housing in such a manner that the pressing force of said spring can be changed, whereby the air pressure to be supplied to said air cylinder is preset according to the change of the pressing force of said spring.

3. The apparatus as defined in claim 2, wherein said completion valve activation assembly includes a cylinder for receiving the compressed air from said air-pressure setting valve, and a completion valve activating piston for moving said completion valve to its activated position, wherein a check valve is arranged in parallel with said air-pressure setting valve to discharge the compressed air remaining in said cylinder of said completion valve activation assembly to said air cylinder after the completion of the operation of said completion valve activation assembly, so as to return said completion valve activating piston to its initial position.

4. The apparatus as defined in claim 2, further including: an air motor adapted to rotate said mandrel about its axis in a forward direction to allow said nut-type fastener to be threadedly connected with said mandrel and in a reverse direction to allow said threadedly connected fastener to be disengaged from said mandrel, wherein said completion valve is operable in its initial position to rotate said air motor in said forward direction, and operable in the activated position to rotate said air motor in said reverse direction, wherein when the air pressure onto the air piston reaches said preset air pressure level, said completion valve is moved to said activated position to rotate said air motor in said reverse direction so that said fastener threadedly connected with said mandrel is disengaged therefrom.

5. The apparatus as defined in claim 1, wherein said fastener is a blind nut or a press nut.